

AMENDMENT(S) TO THE CLAIMS

This listing of claims will replace all prior versions and listings of the claims in this application.

Listing of Claims:

1. (Original) A composition comprising:
  - a) at least one type of ordered, crystalline and microporous material with an average pore diameter less than 15 Angstroms;
  - b) At least one type of non-crystalline inorganic oxide, said inorganic oxide having mesopores or mesopores and micropores and, wherein said inorganic oxide has a peak in an X-ray diffraction pattern between 0.3 and 3 degrees in  $2\theta$ , and wherein said mesopores are interconnected mesopores.
2. (Original) The composition of claim 1 wherein the said crystalline microporous materials are selected from a group consisting of zeolite Beta, zeolite Y, USY, mordenite, Zeolite L, ZSM-5, ZSM-11, ZSM-12, ZSM-20, Theta-1, ZSM-23, ZSM-34, ZSM-35, ZSM-48, SSZ-32, PSH-3, MCM-22, MCM-49, MCM-56, ITQ-1, ITQ-2, ITQ-4, ITQ-21, SAPO-5, SAPO-11, SAPO-37, Breck-6 and  $\text{ALPO}_4$ -5.

3. (Original) The composition of claim 1 wherein the at least one inorganic oxide has at least 97 volume percent mesopores based on micropores and mesopores of the inorganic oxide, a surface area of 400 - 1100 m<sup>2</sup>/g, and a total pore volume of about 0.3-2.2 cm<sup>3</sup>/g.

4. (Original) The composition of claim 3 wherein the mesopores have a size ranging from about 2 nm to about 25 nm.

5. (Original) The composition of claim 3 wherein the porous inorganic oxide is silicon oxide.

6. (Original) The composition of claim 1 further comprising at least one type of metal.

7. (Original) The composition of claim 6 wherein the metal is incorporated into the zeolite framework as substitutions of lattice atoms and/or located inside the zeolite micropores.

8. (Original) The composition of claim 6 wherein the metal is incorporated into the inorganic oxide inside at least one mesopore wall and/or on at least one mesopore surface.

9. (Original) The composition of claim 6 wherein the metal is at least one metal selected from the group consisting of aluminum, titanium, vanadium, zirconium, gallium, boron,

manganese, zinc, copper, gold, lanthanum, chromium, molybdenum, nickel, cobalt, iron, tungsten, palladium and platinum.

10. (Original) The composition of claim 1 wherein the composition percentage by weight of the crystalline microporous material ranges from about 3% to about 90%.

11. (Original) The composition of claim 1 wherein the composition percentage by weight of the microporous zeolite ranges from about 4% to about 80%.

12. (Original) A method for making a catalytic material which comprises the steps of:

- a) pretreating a zeolite;
- b) combining the pretreated zeolite with water, an inorganic oxide or a precursor of an inorganic oxide, and at least one mesopore-forming organic compound to form a mixture;
- c) drying the mixture;
- d) heating the dried mixture to a temperature and for a period of time sufficient to form a mesoporous inorganic oxide structure.

13. (Currently amended) ~~The method of claim 12~~ A method for making a catalytic material which comprises the steps of:

a) pretreating a zeolite;

b) combining the pretreated zeolite with water, an inorganic oxide or a precursor of an inorganic oxide, and at least one mesopore-forming organic compound to form a mixture;

c) drying the mixture;

d) heating the dried mixture to a temperature and for a period of time sufficient to form a mesoporous inorganic oxide structure,

wherein the zeolite is a lamellar zeolite and the pretreatment includes delamination or intercalation of the lamellar zeolite.

14. (Original) The method of claim 13 wherein said delamination is accomplished by contacting the lamellar zeolite with an alkali solution of cationic surfactant under conditions allowing the lamellar zeolite to swell and delaminate.

15. (Original) The method of claim 13 wherein the delamination of the zeolite comprises subjecting the zeolite to ultrasonic treatment.

16. (Original) The method of claim 12 wherein the pretreatment includes ion exchange, impregnation, immobilization of functional species and/or steaming.

17. (Original) The method of claim 12 wherein the mesopore-forming organic compound is selected from the group consisting of glycerol, diethylene glycol, triethylene glycol,

tetraethylene glycol, propylene glycol, triethanolamine, triisopropanolamine, starch, sulfolane, tetraethylene pentamine and diethylene glycol dibenzoate.

18. (Original) The method of claim 12 wherein said mesopore-forming organic compound has a boiling point of at least 150°C.

19. (Original) The method of claim 12 wherein the inorganic oxide is formed by reacting an inorganic oxide precursor with water.

20. (Original) The method of claim 12 wherein the mixture is maintained at a pH above about 7.0.

21. (Original) The method of claim 14 wherein the mixture is dried by heating in air at a temperature and for a period of time sufficient to drive off at least a major portion of the water and mesopore-forming organic compounds.

22. (Original) The method of claim 12 wherein the heating step (d) comprises heating the dried mixture to a temperature of from about 100°C to about 250°C.

23. (Original) The method of claim 12 further comprising the step of calcining the heated dried mixture at a temperature of from about 300°C to about 1000°C for at least a period of time sufficient to effect removal of the mesopore-forming organic compound from the mesoporous, inorganic oxide support.

24. (Original) The method of claim 12 further comprising combining metal ions with the mixture, the metal being selected from the group consisting of aluminum, titanium, vanadium, zirconium, gallium, boron, manganese, zinc, copper, gold, lanthanum, chromium, molybdenum, nickel, cobalt, iron, tungsten, palladium and platinum.

25. (Original) The method of claim 12 further comprising the steps of admixing a binder with the catalytic material and forming the catalytic material into a predetermined shape.

26. (Original) A method for making a catalytic material which comprises the steps of:

- a) contacting a lamellar structured zeolite with an alkaline solution of cationic surfactant under conditions allowing the lamellar zeolite to swell;
- b) combining the swollen zeolite with water, an inorganic oxide or a precursor of an inorganic oxide, and at least one mesopore-forming organic compound to form a mixture;
- c) delaminating the lamellar zeolite;
- d) drying the mixture;

e) heating the dried mixture to a temperature and for a period of time sufficient to form a mesoporous oxide structure.

27. (Original) The method of claim 26 wherein said mesopore-forming organic compound is selected from the group consisting of glycerol, diethylene glycol, triethylene glycol, tetraethylene glycol, propylene glycol, triethanolamine, triisopropanolamine, sulfolane, tetraethylene pentamine and diethylene glycol dibenzoate.

28. (Original) The method of claim 26 wherein said mesopore-forming organic compound has a boiling point of at least 150°C.

29. (Original) The method of claim 26 wherein the inorganic oxide is formed by reacting an inorganic oxide precursor with the water.

30. (Original) The method of claim 29 wherein the inorganic oxide precursor is selected from the group consisting of silica sources and alumina sources.

31. (Original) The method of claim 26 wherein the mixture is maintained at a pH above about 7.0.

32. (Original) The method of claim 26 wherein the mixture is dried by heating in air at a temperature and for a period of time sufficient to drive off water and volatile organic compounds.

33. (Original) The method of claim 26 wherein the heating step (e) comprises heating the dried mixture to a temperature of from about 100°C to about 250°C.

34. (Original) The method of claim 26 wherein the heating step (e) comprises heating the dried material to a temperature of from about 150°C to about 200°C.

35. (Original) The method of claim 26 further comprising the step of calcining the heated dried mixture at a temperature of from about 300°C to about 1000°C.

36. (Original) The method of claim 26 further including the step of calcining the heated dried mixture at a temperature of from about 400°C to about 700°C for about 2 hours to about 40 hours.

37. (Original) The method of claim 26 further comprising combining metal ions with the mixture, the metal being selected from the group consisting of aluminum, titanium, vanadium,



Appln. No. 10/691,358  
Amendment dated October 13, 2005  
Reply to the Office Action of July 1, 2005

zirconium, gallium, boron, manganese, zinc, copper, gold, lanthanum, chromium, molybdenum, nickel, cobalt, iron, tungsten, palladium and platinum.

38. (Original) The method of claim 26 further comprising the steps of admixing a binder with the catalytic material and forming the catalytic material into a predetermined shape.

Claims 39 to 55, (Cancelled)